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| LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999 | | | DICT, RACHEL S | |
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| | | | 2853 | |

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,871

Applicant(s)

GIBSON ET AL.

Examiner

Rachel Dicht

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 11-14, 16-28, 32-35 and 37-43 is/are rejected.
- 7) ☒ Claim(s) 8-10, 15, 29-31 and 36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 and 06 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449, or PTO/SB/08)
Paper No(s)/Mail Date 10/17/2003 01/22/04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: IDS Mailed Date 1/22/2004

DETAILED ACTION

1. Claims 16-21 and 37-43 objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 21, 22, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Merrill (US. Pat. No. 6,299,270).

In regard to:

Claim 1:

Merrill teaches an apparatus including a printhead (44, Fig. 2) for an inkjet printer, the printhead comprising: an ink reservoir (refer to column 2 lines 18-21); nozzles (orifice plate 50, Fig. 2) (refer to column 2 lines 24-27) for ejecting ink from the ink reservoir onto print media (12, Fig. 1), the nozzles being formed in the ink jet printer printhead in a predetermined fashion with bores purposefully shaped and/or directed to determine the formation and placement of satellite

droplets when ink is ejected from the ink reservoir when the printhead is part of an inkjet printer (refer to column 3 lines 9-10 and column 5 lines 26-33).

Claim 22:

Merrill teaches a method of controlling the formation and placement of satellite droplets ejected from an ink jet printer printhead comprising the steps of: providing an ink jet printer printhead (44, Fig. 2) having an ink reservoir (refer to column 2 lines 18-21); forming nozzles in the ink jet printer printhead (orifice plate 50, Fig. 2)(refer to column 2 lines 24-27); installing the printhead in an ink jet printer (10, Fig. 1); ejecting ink from the reservoir through the nozzles in the form of main drops and satellite droplets in a manner to achieve uniform density control by controlling the formation and placement of satellite droplets when ink is ejected from the reservoir of the ink jet printer printhead when the printhead is part of an ink jet printer (refer to column 3 lines 9-10 and column 5 lines 26-33).

Claim 21 and 42:

Merrill teaches an apparatus wherein the nozzle bores are cut with an eximer laser (refer to column 5 lines 33-37).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 5, 6, 7, 12, 13, 23, 24, 26, 27, 28, 33, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill (US Pat. No. 6,299,270) in view of Oikawa (US Pat. No. 6,126,282).

In regard to:

Claims 2 and 23:

The device of Merrill teaches an apparatus and method wherein: each of the nozzles produces a main drop and a satellite droplet (refer to column 3 lines 53-55) when ink is ejected through the nozzles, and each nozzle includes a bore (refer to column 3 lines 9-10).

It is noted however, that Merrill fails to teach a printhead used in a printer which prints in two directions, and the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced-the combination area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction.

However, Oikawa teaches teach a printhead used in a printer which prints in two directions (Head Scanning Direction, Fig. 6)(refer to column 5 lines 35-38), and the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced-the combination area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction (refer to column 6 lines 41-49).

Claims 3 and 24:

The device of Merrill DIFFERS from claims 3 and 24 in that it fails to teach the ink ejected through the nozzles, where the satellite droplets ejected through the nozzles at least partially overlap the main drops in each direction of printing.

However, Oikawa teaches teach the ink ejected through the nozzles, where the satellite droplets (Da2 and Da2', Fig. 1A and 1B) ejected through the nozzles at least partially overlap the main drops in each direction of printing (main direction of printing located in Fig. 1A, secondary direction located in 1B) (refer to column 6 lines 41-49).

Claims 5 and 26:

Merrill teaches an apparatus and method wherein each of the nozzles produces a main drop and a satellite droplet (refer to column 3 lines 53-55) when ink is ejected through the nozzles, each nozzle includes a bore, each bore has an axis (refer to column 3 lines 9-10), and a first plurality of nozzles have the axes of their bores aligned in a first direction (refer to Fig. 4).

It is noted, however, that Merrill fails to teach ink ejected through the nozzles, each of the satellite droplets ejected through the first plurality of nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance.

However, Oikawa teaches ink ejected through the nozzles, each of the satellite droplets ejected through the first plurality of nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance (refer to Fig. 1A and 1B; satellite drop is labeled Da2 and Da2' and main drop is labeled as Da1 and Da1').

Claims 6 and 27:

The device of Merrill DIFFERS from claims 6 and 27 in that it fails to teach each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media.

However, Oikawa teaches each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media (refer to column 6 lines 41-49; Fig. 1A).

Claims 7 and 28:

Merrill teaches the inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops (refer to Figs. 3A, 3B, and 3C; motion of print head is to right of page).

Claims 12 and 33:

Merrill teaches an ink jet printer including the printhead, and wherein the ink jet printer includes means for printing in a single lateral direction so that the main drop and satellite droplet at least partially overlap (refer to Figs. 3A, 3b and 3C; movement is to right of page).

Claims 13 and 34:

Merrill teaches an ink jet printer including the printhead, wherein the bores are aligned so that the main drop and satellite droplet (refer to column 3 lines 53-55) ejected from substantially all of the nozzles at least partially overlap when the printer prints (refer to Figs. 3A, 3B and 3C; movement is to right of page).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Merrill to include a printer that prints bi-directionally and the satellite drop and main drop are balanced in both directions of printing as taught by Oikawa for the purpose of increasing printing speed.

6. Claims 4, 11, 14, 17, 18, 25, 32, 35, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill (US Pat. No. 6,299,270) in view of Weber et al. (US Pat. No. 6,155,670).

In regard to:

Claims 4 and 25:

Merrill teaches a nozzle producing a main drop and a satellite droplet (refer to column 3 lines 53-55) when ink is ejected through the nozzles, each nozzle includes a bore, and each bore has an axis (refer to column 3 lines 9-10).

It is noted, however, that Merrill fails to teach a first plurality of nozzles having the axes of their bores aligned in a first direction, a second plurality of nozzles having the axes of their bores aligned in a second direction, and when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected

through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

However, Weber et al. teaches a first plurality of nozzles (411', Fig. 13) having the axes of their bores aligned in a first direction (1301, Fig. 13), a second plurality of nozzles (413', Fig. 13) having the axes of their bores aligned in a second direction (1302, Fig. 13), and when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles (refer to column 17 lines 57-65).

Claims 11 and 32:

The device of Merrill DIFFERS from claims 11 and 32 in that it fails to teach a second plurality of nozzles having their axes of their bores aligned in a second direction, and when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

However, Weber et al. teaches a second plurality of nozzles (413', Fig. 13) having their axes of their bores aligned in a second direction (1302, Fig. 13), and when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles (refer to column 17 lines 57-65).

Claims 14 and 35:

Merrill teaches a nozzle producing a main drop and a satellite droplet (refer to column 3 lines 53-55) when ink is ejected through the nozzles, each nozzle includes a bore, and each bore has an axis (refer to column 3 lines 9-10).

It is noted, however, the Merrill fails to teach a first plurality of the nozzles have the axes of their bores aligned in a first direction, a second plurality of the nozzles have the axes of their bores aligned in a second direction, and when ink is ejected through the nozzles, the main drops ejected through the first plurality of the nozzles are offset in a different direction from the fire point from which main drops ejected through the second plurality of the nozzles are offset from the fire point.

However, Weber et al. teaches a first plurality of the nozzles (411', Fig. 13) have the axes of their bores aligned in a first direction (1301, Fig. 13), a second plurality of the nozzles (413', Fig. 13) have the axes of their bores aligned in a second direction (1302, Fig. 13), and when ink is ejected through the nozzles, the main drops ejected through the first plurality of the nozzles are offset in a different direction from the fire point from which main drops ejected through the second plurality of the nozzles are offset from the fire point (refer to column 17 lines 57-65).

Claims 16 and 37:

The device of Merrill DIFFERS from claims 16 and 37 in that they fail to teach the nozzle bores are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing.

However, Weber et al. teaches the nozzle bores (411' and 413', Fig. 13) are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing (refer to column 17 lines 59-65).

Claims 17 and 38:

The device of Merrill DIFFERS from claims 17 and 38 in that it fails to teach an apparatus or method further comprising an inkjet print head comprising the inkjet print head chip.

However, Weber et al. teaches an apparatus or method further comprising an inkjet print head comprising the inkjet print head chip (218, Fig. 2 and 2A) (refer to column 8 lines 33-36).

Claims 18 and 39:

The device of Merrill DIFFERS from claims 18 and 39 in that it fails to teach an apparatus or method further comprising an ink jet printer comprising the inkjet printhead.

However, Weber et al. teaches an apparatus or method further comprising an ink jet printer comprising the inkjet printhead (214, Fig. 2) (refer to column 8 lines 31-36).

Claim 43:

The device of Merrill DIFFERS from claim 43 in that it fails to teach the invention substantially shown and described in the application.

However, Weber et al. teaches the invention substantially shown and described in the application.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Merrill to include a first row of nozzles aligned in a first direction and a second row of nozzles aligned in a second direction as taught by Weber et al. for the purpose of dispersing the dots in and around the target pixel (refer to column 18 lines 11-14).

7. Claims 19 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill (US Pat. No. 6,299,270) in view of Yaegashi et al. (US Pat. No. 6,079,809).

The device of Merrill DIFFERS from claims 19 and 40 in that it fails to teach a printhead having large and small nozzles.

However, Yaegashi et al. teaches a printhead having large and small nozzles (113, Fig. 8)(refer to column 8 lines 63-65).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Merrill to incorporate large and small nozzles on a printhead as taught by Yaegashi et al. for the purpose of having better resolution with color images and quicker printing with black and white copies.

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8. Claims 20 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill (US Pat. No. 6,299,270) in view of Inoue et al. (US Pat. No. 5,594,479).

The device of Merrill DIFFERS from claims 20 and 41 in that it fails to teach the nozzle bores formed in a polyimide film.

However, Inoue et al. teaches the nozzle bores formed in a polyimide film (refer to column 16 lines 22-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Merrill to have the nozzle bores formed of a polyimide film as taught by Inoue et al. for the purpose of reducing the amount of scattered ink.

Allowable Subject Matter

9. Claims 8-10, 15, 29-31, and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

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The primary reason for the allowance of claims 8-10, 15, 29-31, and 36 is the inclusion of the limitation of:

Claims 8 and 29:

The inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops.

Claim 15 and 36:

The nozzles are aligned and directed such that when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles, such that: in a first direction of printing, the main drop from the first nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the second nozzle associated with that heater, and in a second direction of printing, the main drop from the second nozzle associated with a heater at least partially overlaps the satellite droplet from that nozzle and at least partially overlaps the satellite droplet from the first nozzle associated with that heater.

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It is these limitation found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel Dicht whose telephone number is 571-272-8544. The examiner can normally be reached on 7:00 am - 3:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSD


July 28, 2005


8/11/05
MANISH S. SHAH
PRIMARY EXAMINER